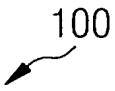
FIG 1



Symbol	Name	Description
→	A2A Link	Medium-range communication (< 5 meters) that requires an active transmitter and an active receiver.
→	A2P Link	Short-range communication (< 3 meters) that requires an active transmitter and a passive receiver (diode detector). The wake-up signals to activate a SP or SA node are transmitted in this link before the data.
→	MBS Link	Short-range communication that requires an active transmitter (to provide the Ether), a passive transmitter (MBS) and an active receiver.
≈	Ether	Electromagnetic field generated by a PU to provide the signal necessary to be used by the passive transmitters (MBS).
↔	Long Link	Long-range communication (> 5 meters) that links Polling Units by using a Bridge.

FIG 2

200

		Link type and data flow direction							
		PU → SA	PU → PU	SA → SA	PU ← SA		PU → SP	PU ← SP	SA → SP
Node	Comm. Units	A2P	A2A	A2A	A2A	MBS	A2P	MBS	A2P
PU	Active Tx	✓	✓				✓		
	Active Rx		✓		✓	✓		✓	
	Ether Provider					✓		✓	
	Wake-up Whistle	✓				✓	✓		
SA	Active Tx			✓	✓				✓
	Passive Rx	✓		✓					
	Passive Tx					✓			
	Wake-up Whistle			✓					✓
	Wake-up Listener	✓		✓		✓			
SP	Passive Rx						✓		✓
	Passive Tx							✓	
	Wake-up Listener						✓		✓

FIG 3

300

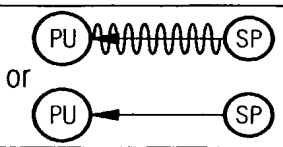
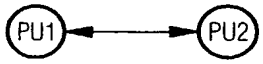
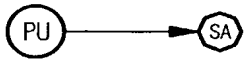
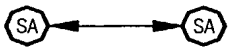
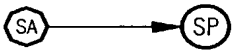
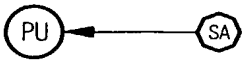
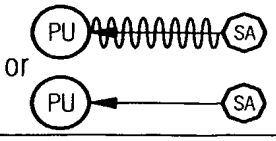
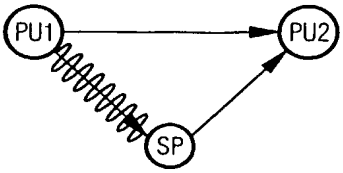
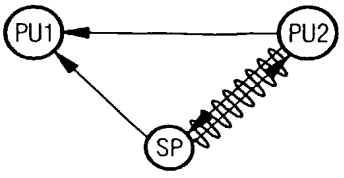
Link	Range	Type of Data	Communication Units	Graphical Representation
PU→SP (A2P)	Short	Configuration and operation data. Activation messages (wake up).	PU: Active Tx PU: Wake-up Wh. SP: Passive Rx SP: Wake-up L.	
PU←SP (MBS)	Short	Sensor data. Identification data.	PU: Ether provider PU: Active Rx SP: Passive Tx	
PU↔PU (A2A)	Medium	Network management messages. Sensor data.	PU: Active Tx PU: Active Rx	
PU→SA (A2P)	Short	Configuration and operation data. Activation messages (wake up). Sensor data	PU: Active Tx PU: Wake-up W. SA: Passive Rx SA: Wake-up L.	
SA↔SA (A2P)	Short	Activation messages (wake up). Sensor data.	SA1: Active Tx SA1: Wake-up W. SA2: Passive Rx SA2: Wake-up L.	
SA→SP (A2P)	Short	Configuration and operation data. Activation messages (wake up).	SA: Active Tx SA: Wake-up W. SP: Passive Rx SP: Wake-up L.	
SA→PU (A2A)	Medium	Sensor data. Identifikacion data.	SA: Active Tx PU: Active Rx	
SA→PU (MBS)	Short	Sensor data. Identifikacion data.	PU: Ether provider PU: Active Rx SA: Passive Tx	
SP→PU (MBS)	Short	Sensor data. Identifikacion data.	PU: Wake-up W. PU1: Ether provider PU2: Active Rx PU1: Active Tx SP: Passive Rx SP: Wake-up L. SP: Passive Tx	
SP→PU (MBS)	Short	Sensor data. Identifikacion data.	PU2: Wake-up W. PU2: Ether provider PU2: Active Rx PU2: Active Tx PU1: Active Rx SP: Passive Rx SP: Wake-up L. SP: Passive Tx	

FIG 4-1

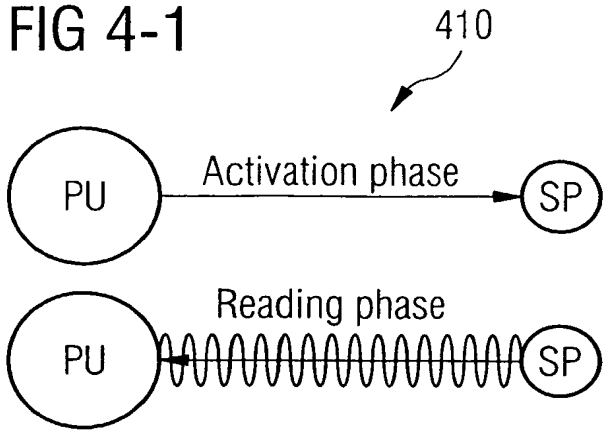

410
PU
Activation phase
SP
Reading phase
PU
SP

FIG 4-2

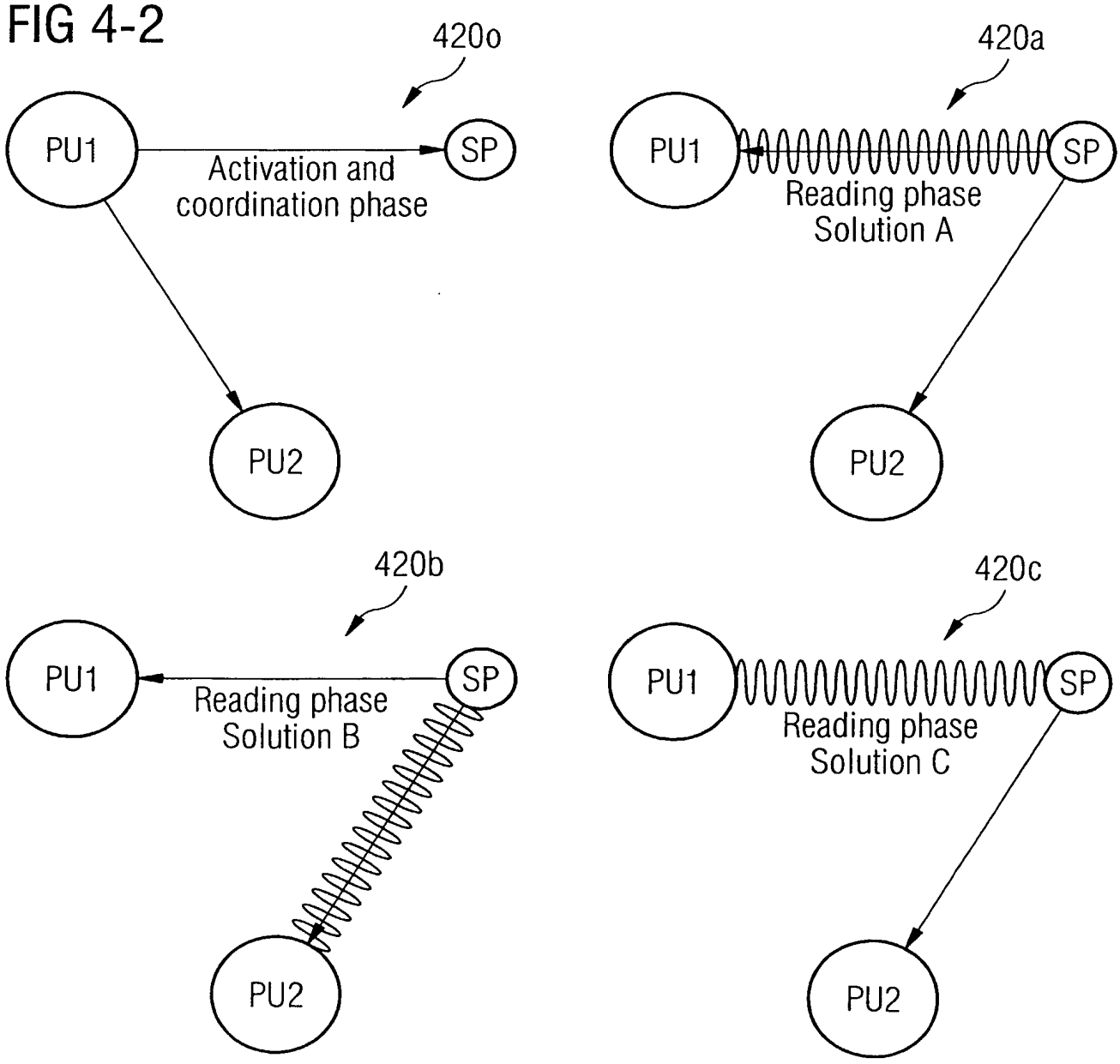

420o
PU1
Activation and
coordination phase
SP
PU2
420a
PU1
Reading phase
Solution A
SP
PU2
420b
PU1
Reading phase
Solution B
SP
PU2
420c
PU1
Reading phase
Solution C
SP
PU2

FIG 4-3

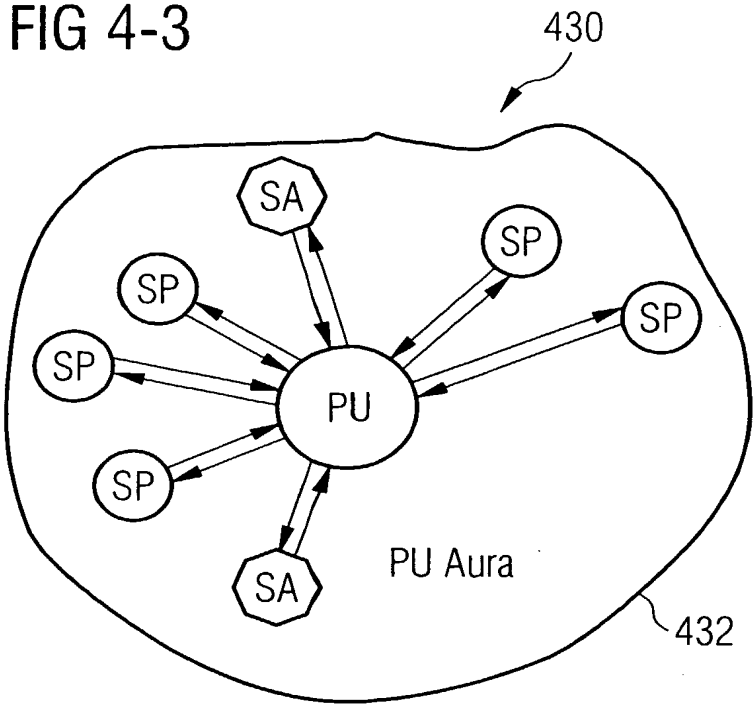

430
SA
SP
SP
SP
SP
PU
SP
SA
PU Aura
432

FIG 4-4

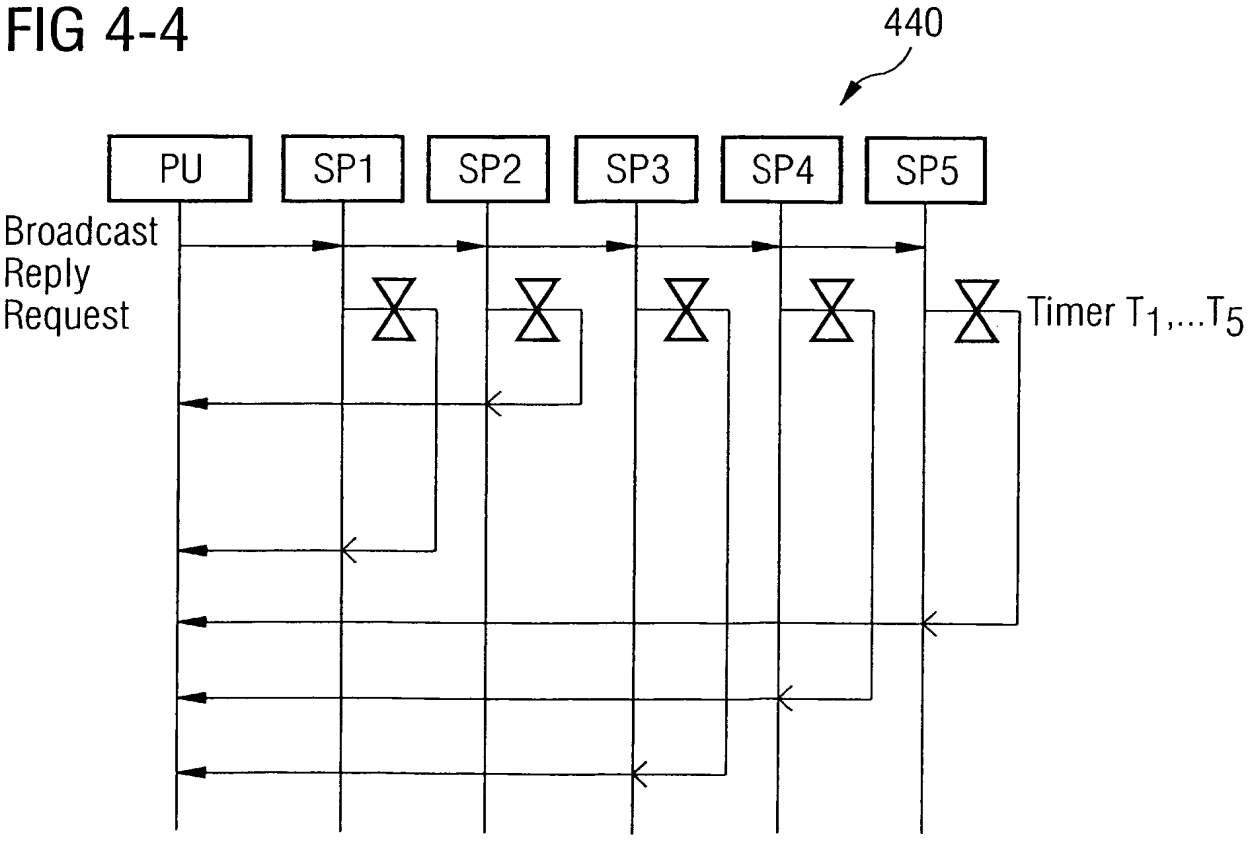

440
PU
SP1
SP2
SP3
SP4
SP5
Broadcast
Reply
Request
Timer T_1,...T_5

FIG 4-5

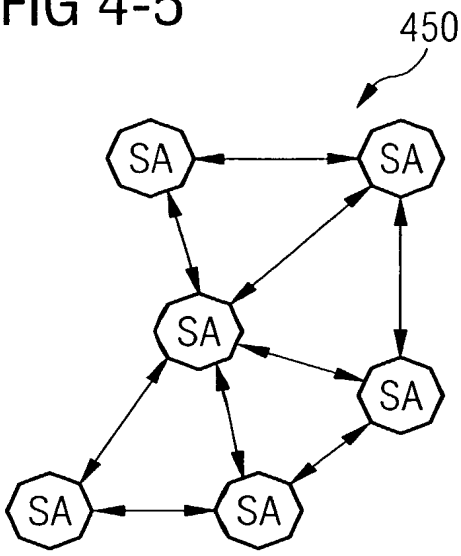

450
SA
SA
SA
SA
SA
SA

FIG 4-6

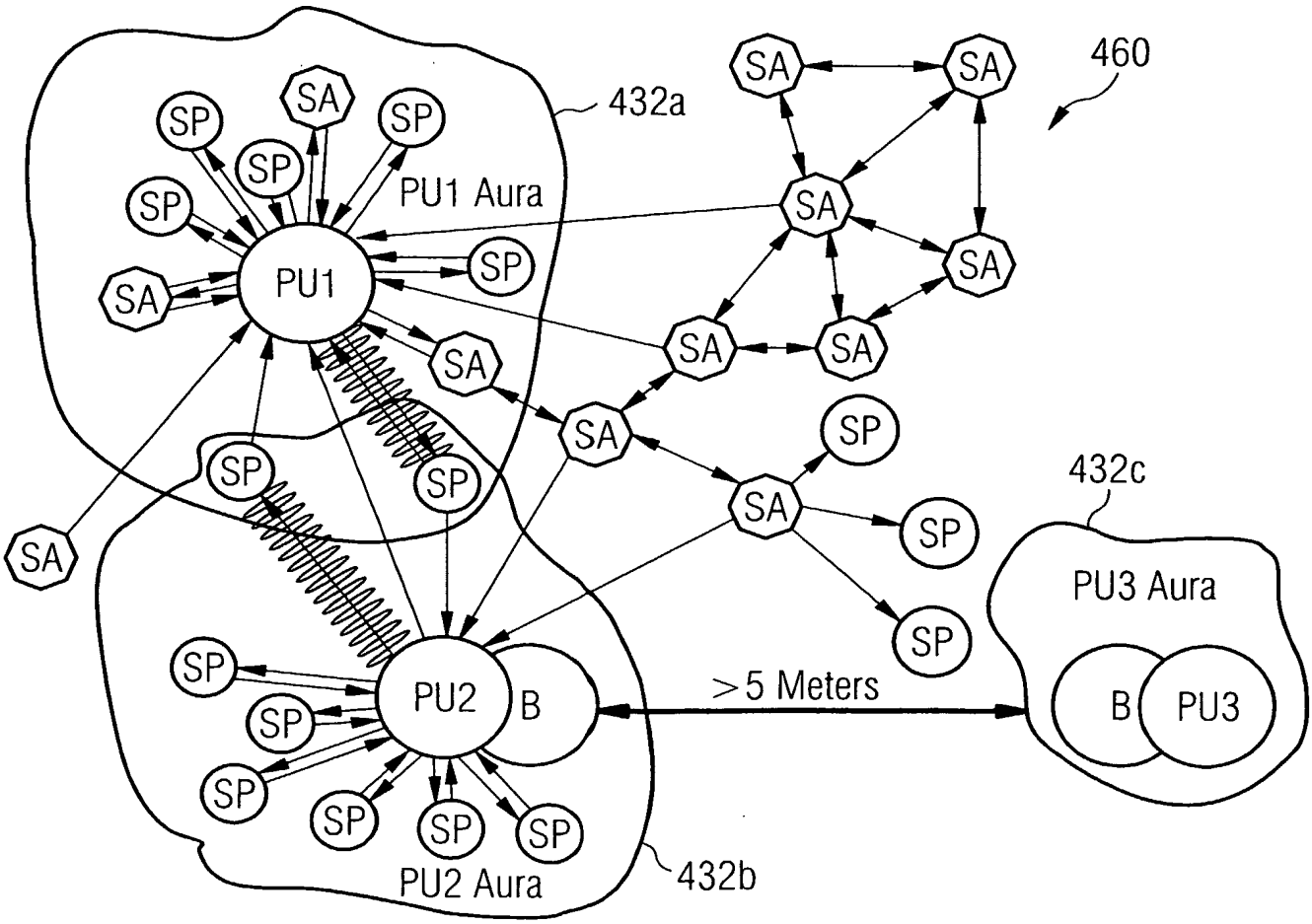

460
432a
PU1 Aura
PU1
SP
SA
432c
PU3 Aura
B
PU3
>5 Meters
PU2
B
PU2 Aura
432b

FIG 4-7

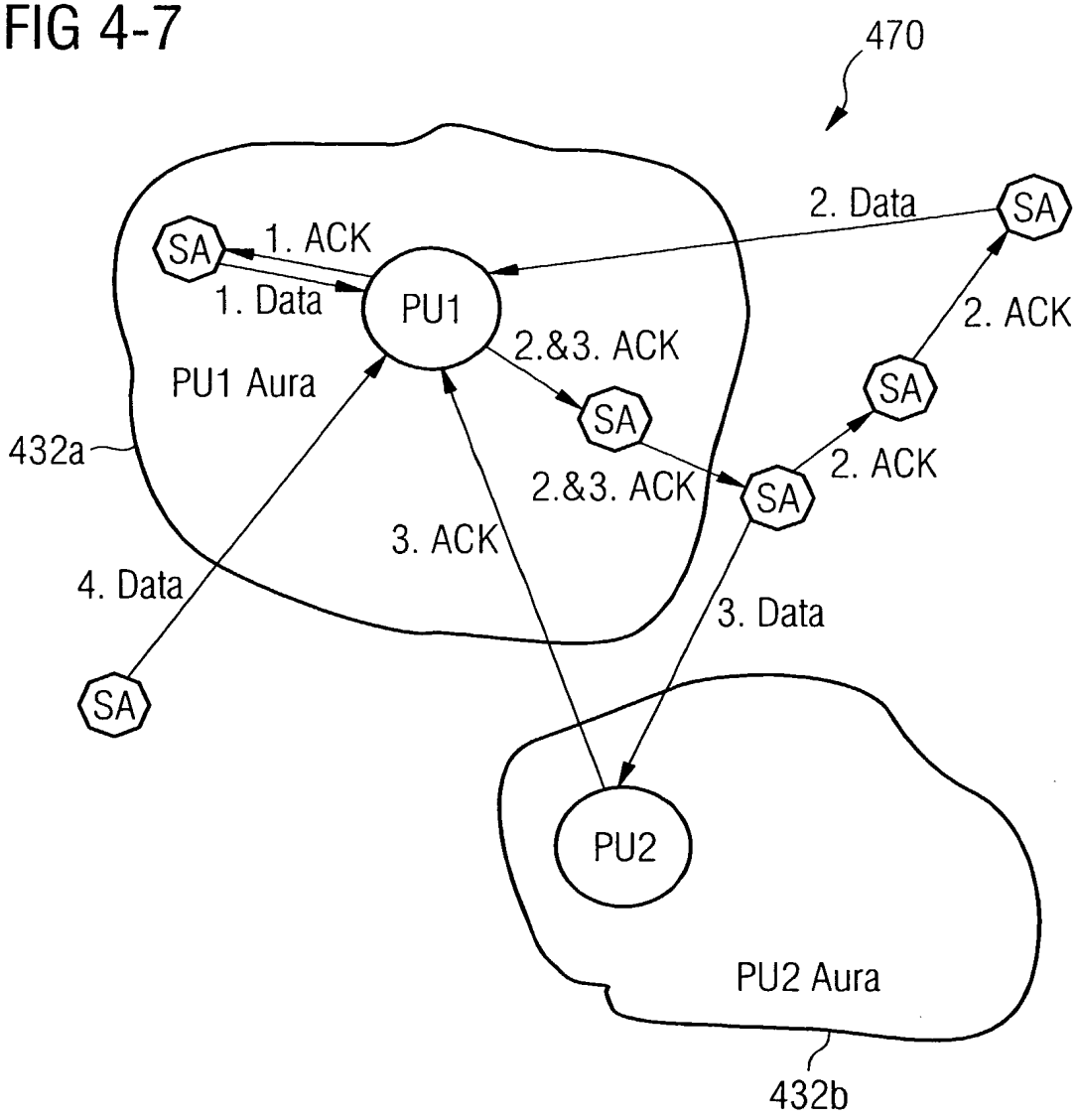

470
SA
1. ACK
1. Data
PU1
2. Data
SA
2. ACK
SA
2.&3. ACK
PU1 Aura
SA
2. ACK
2.&3. ACK
SA
432a
3. ACK
4. Data
3. Data
SA
PU2
PU2 Aura
432b

FIG 4-8

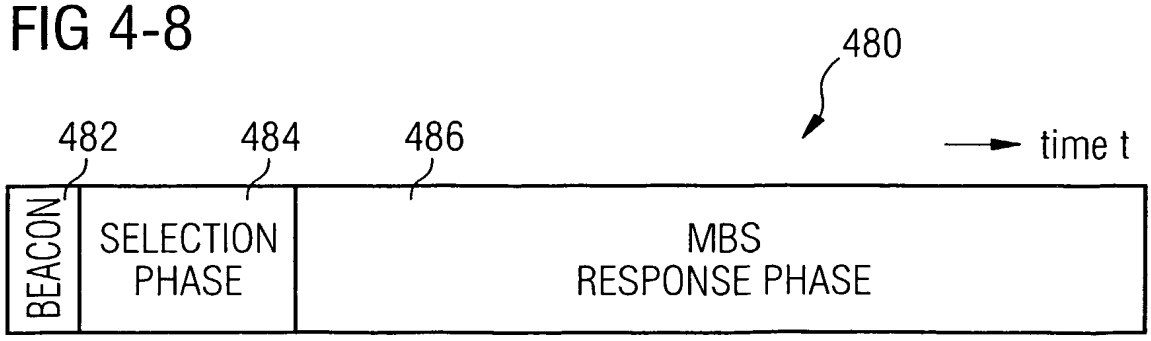

480
482
484
486
time t
BEACON
SELECTION PHASE
MBS RESPONSE PHASE

FIG 4-9

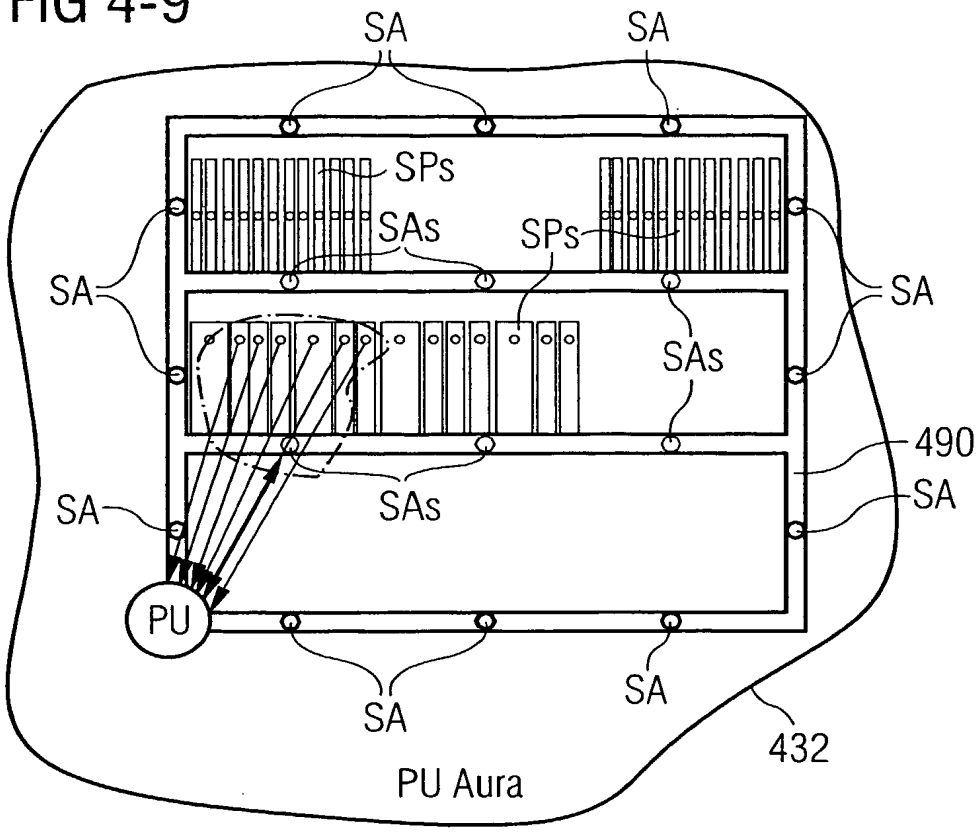


FIG 4-10

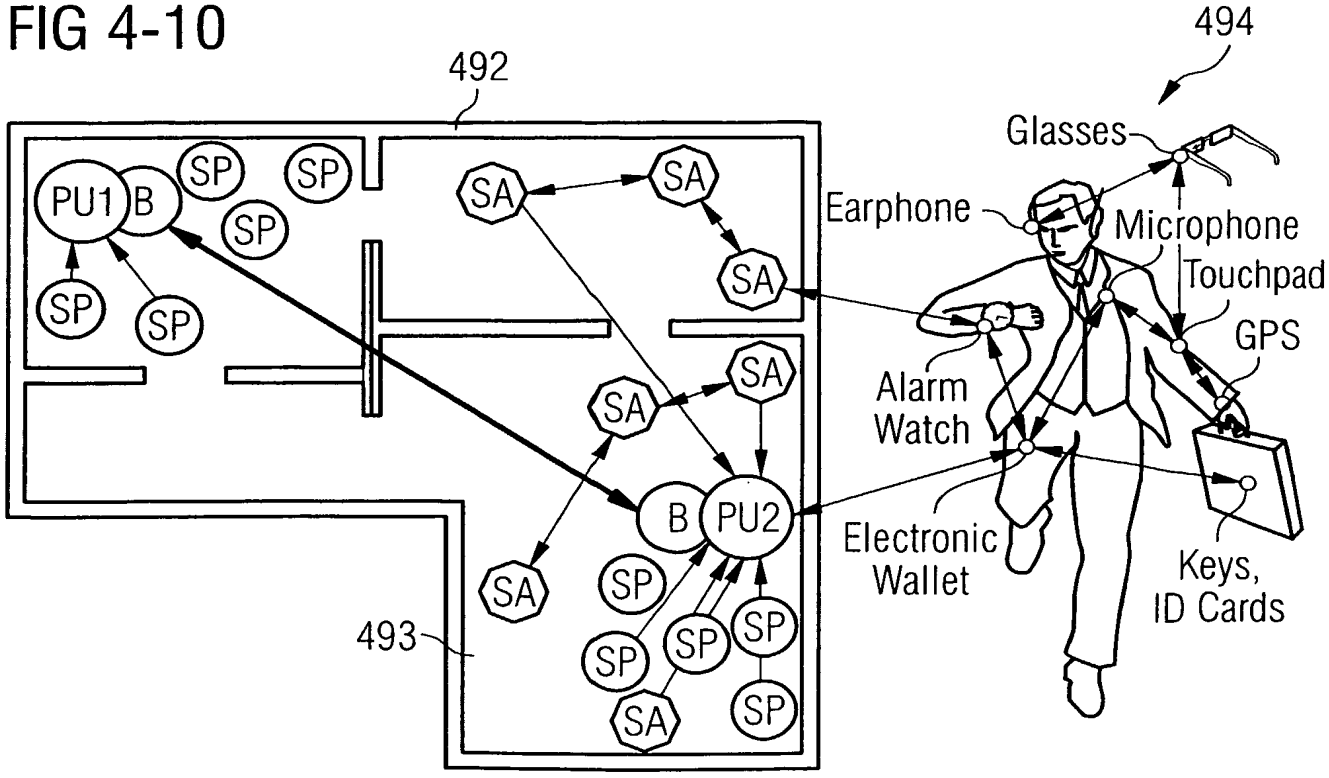


FIG 5-1

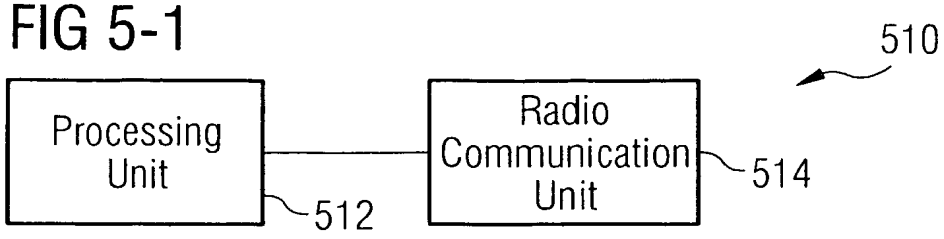


FIG 5-2

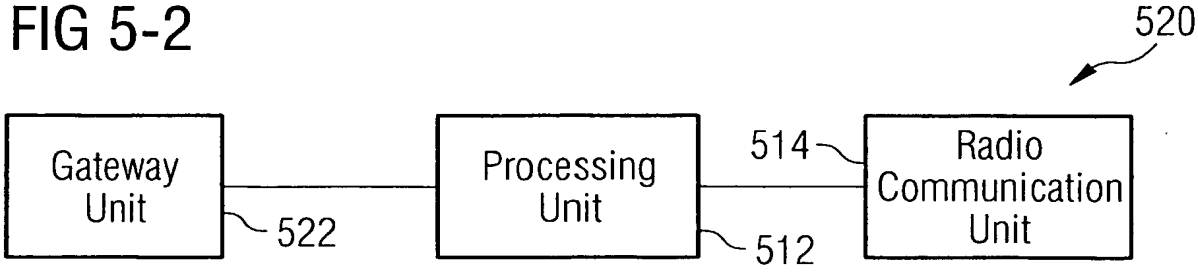


FIG 5-3

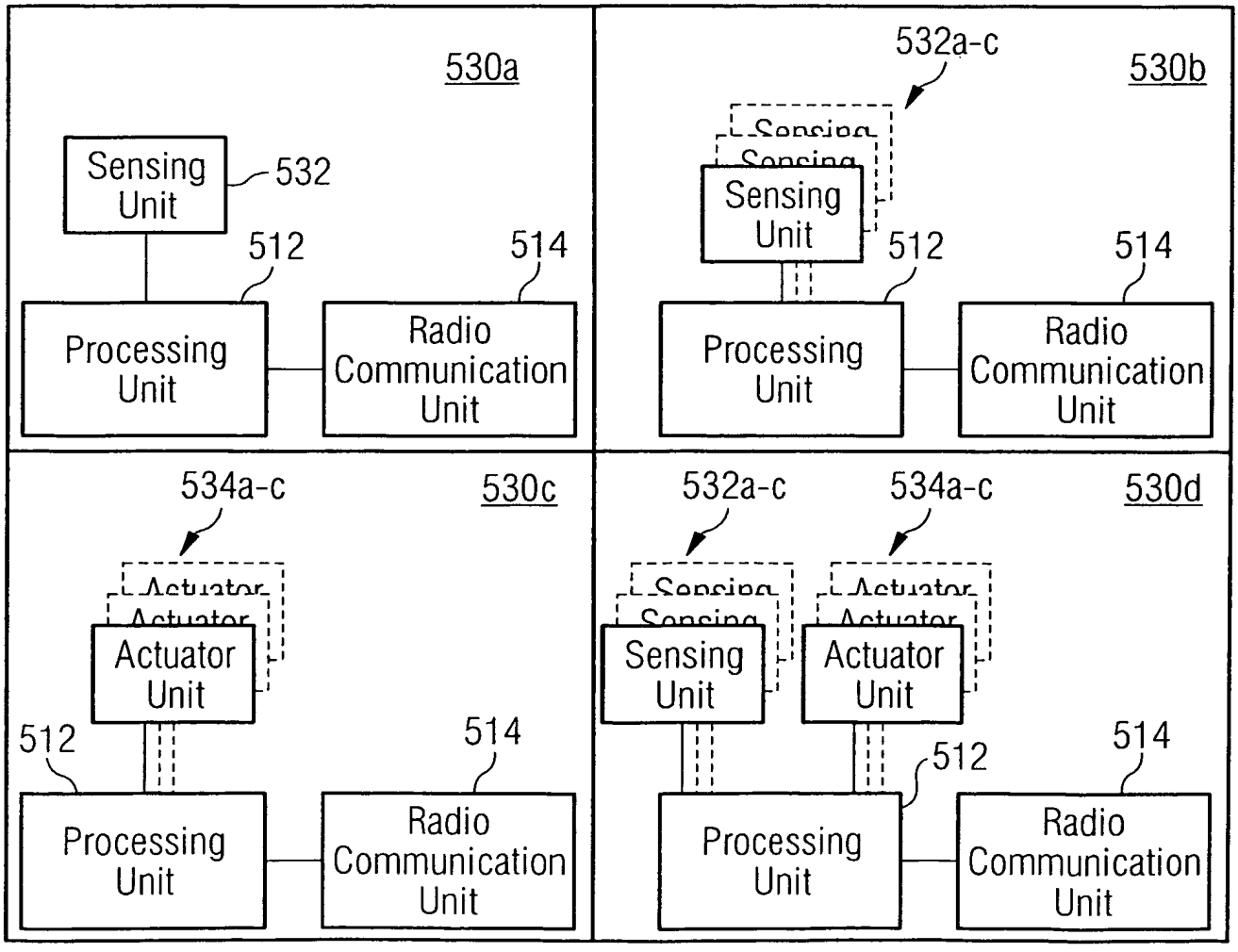


FIG 5-4

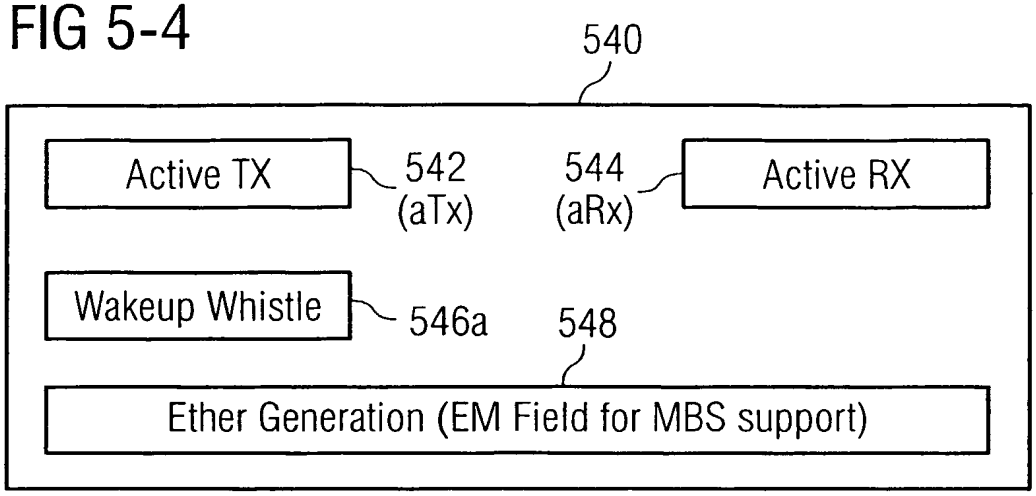


FIG 5-5

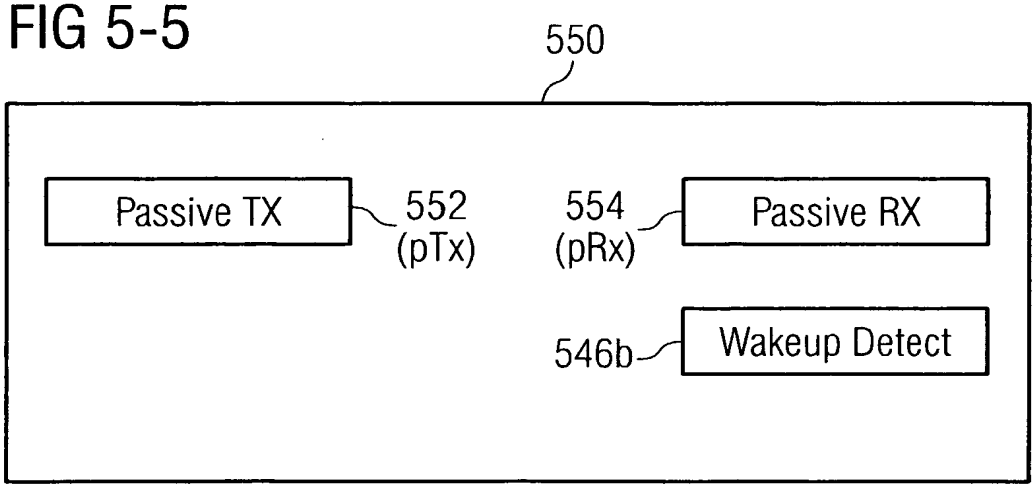


FIG 5-6

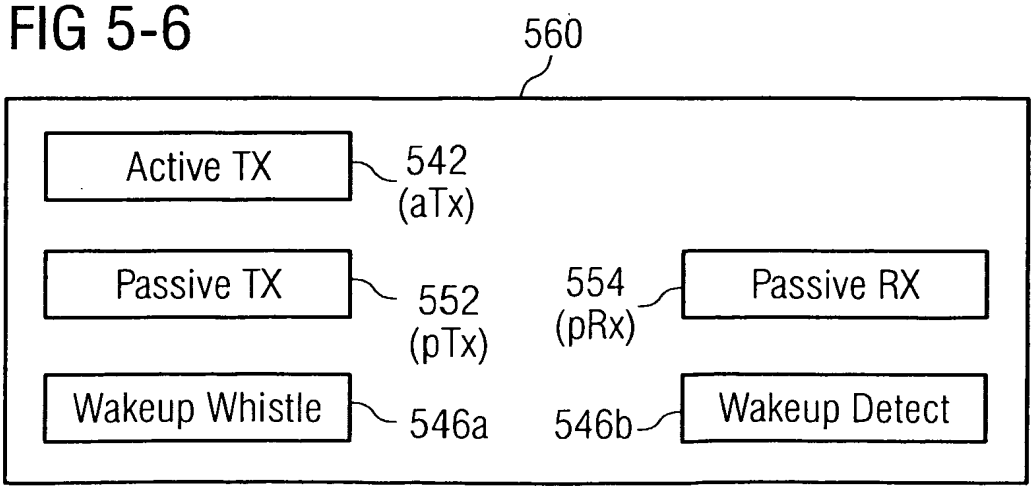


FIG 5-7


570
Wake-Up
ID
Data
Time

FIG 5-8

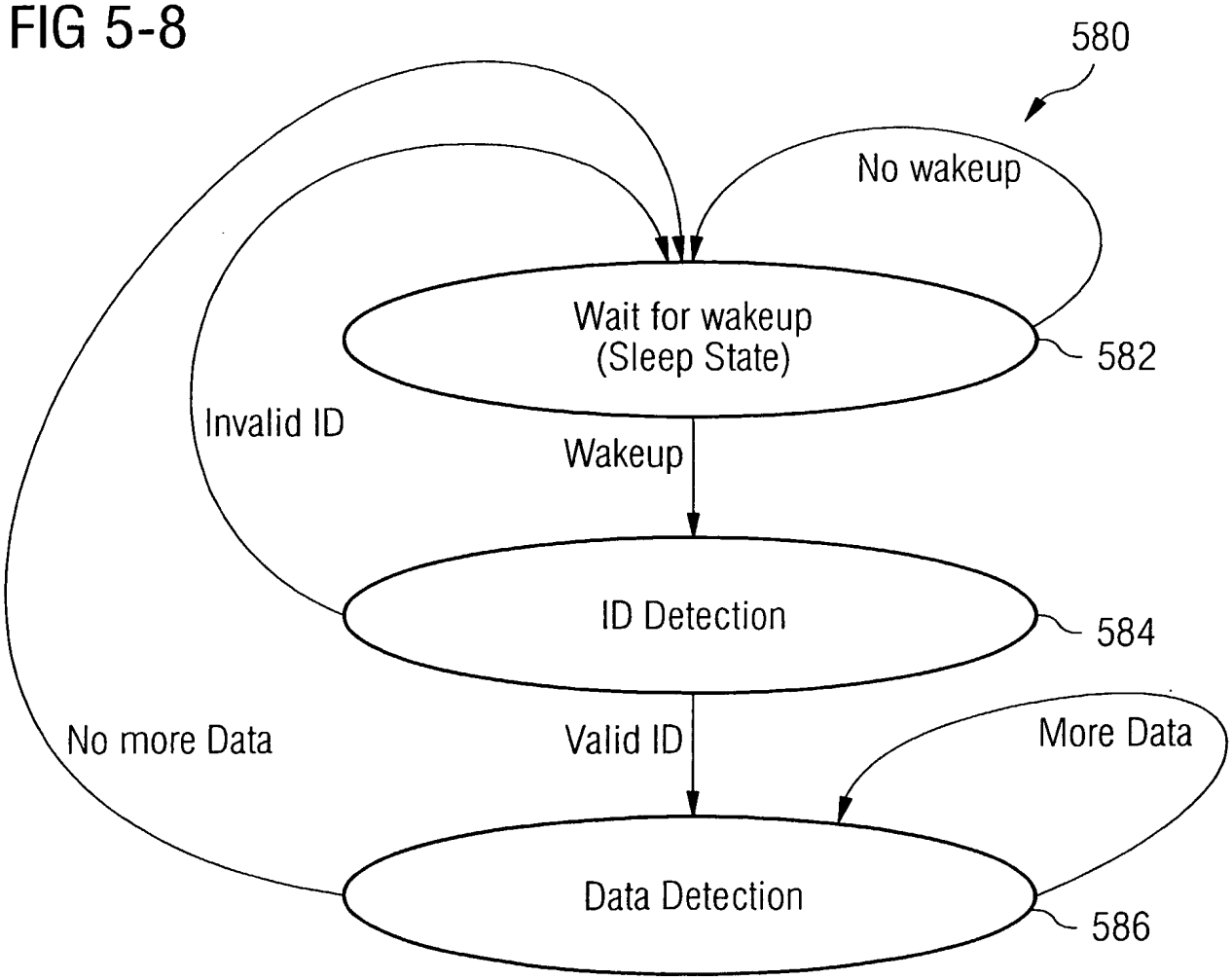

580
No wakeup
Wait for wakeup
(Sleep State)
582
Invalid ID
Wakeup
ID Detection
584
No more Data
Valid ID
More Data
Data Detection
586

FIG 6-1

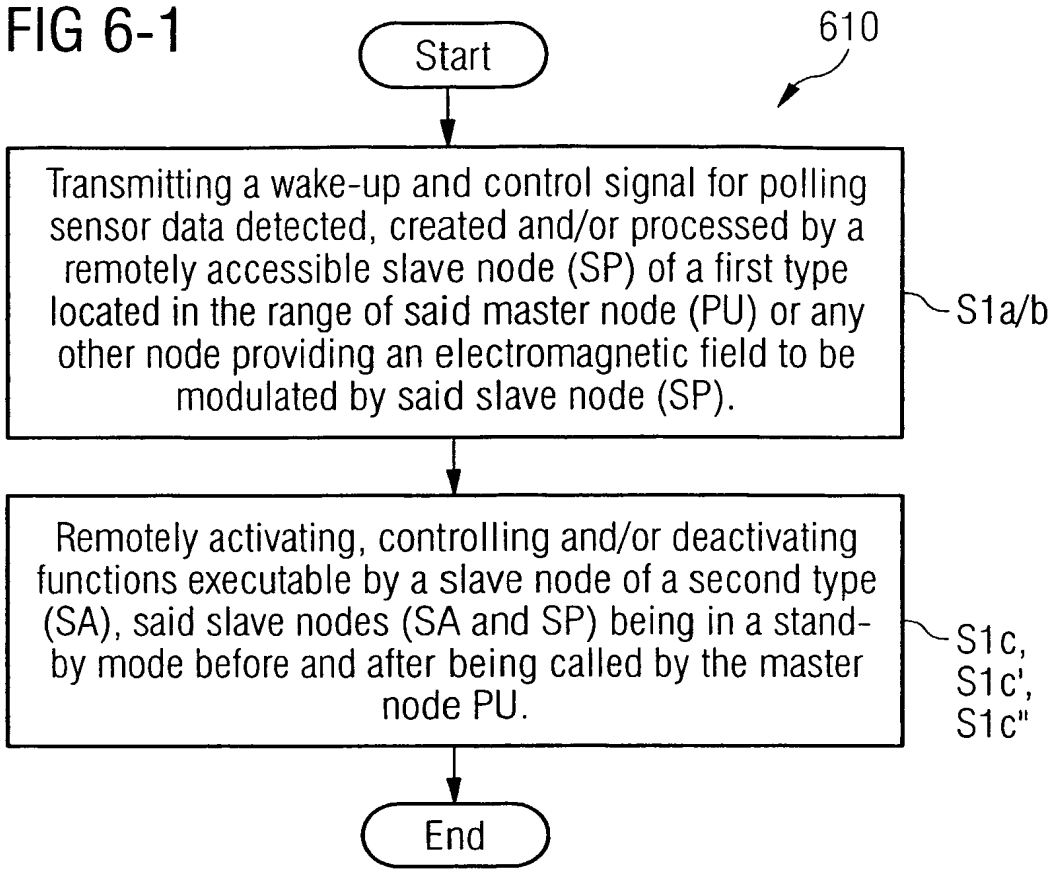

Start
610
Transmitting a wake-up and control signal for polling sensor data detected, created and/or processed by a remotely accessible slave node (SP) of a first type located in the range of said master node (PU) or any other node providing an electromagnetic field to be modulated by said slave node (SP).
S1a/b
Remotely activating, controlling and/or deactivating functions executable by a slave node of a second type (SA), said slave nodes (SA and SP) being in a stand-by mode before and after being called by the master node PU.
S1c, S1c', S1c"
End

FIG 6-2

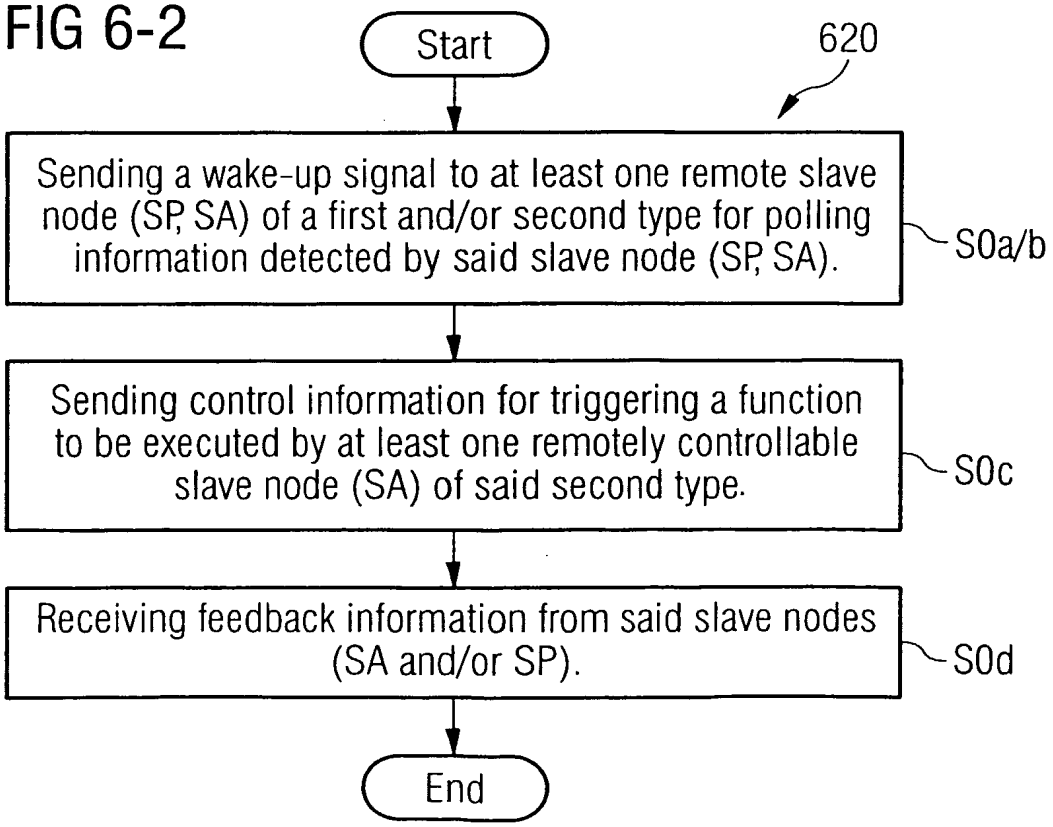

Start
620
Sending a wake-up signal to at least one remote slave node (SP, SA) of a first and/or second type for polling information detected by said slave node (SP, SA).
S0a/b
Sending control information for triggering a function to be executed by at least one remotely controllable slave node (SA) of said second type.
S0c
Receiving feedback information from said slave nodes (SA and/or SP).
S0d
End

FIG 6-3

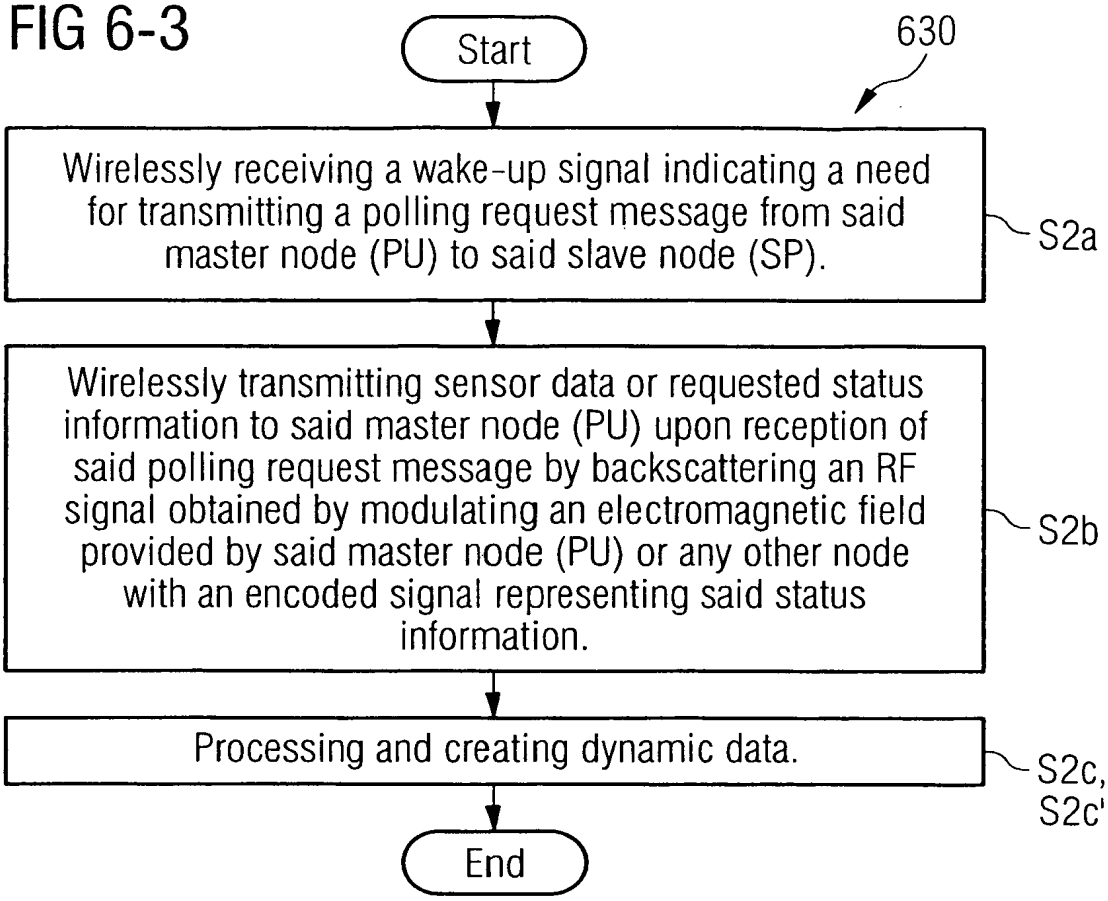


FIG 6-4a

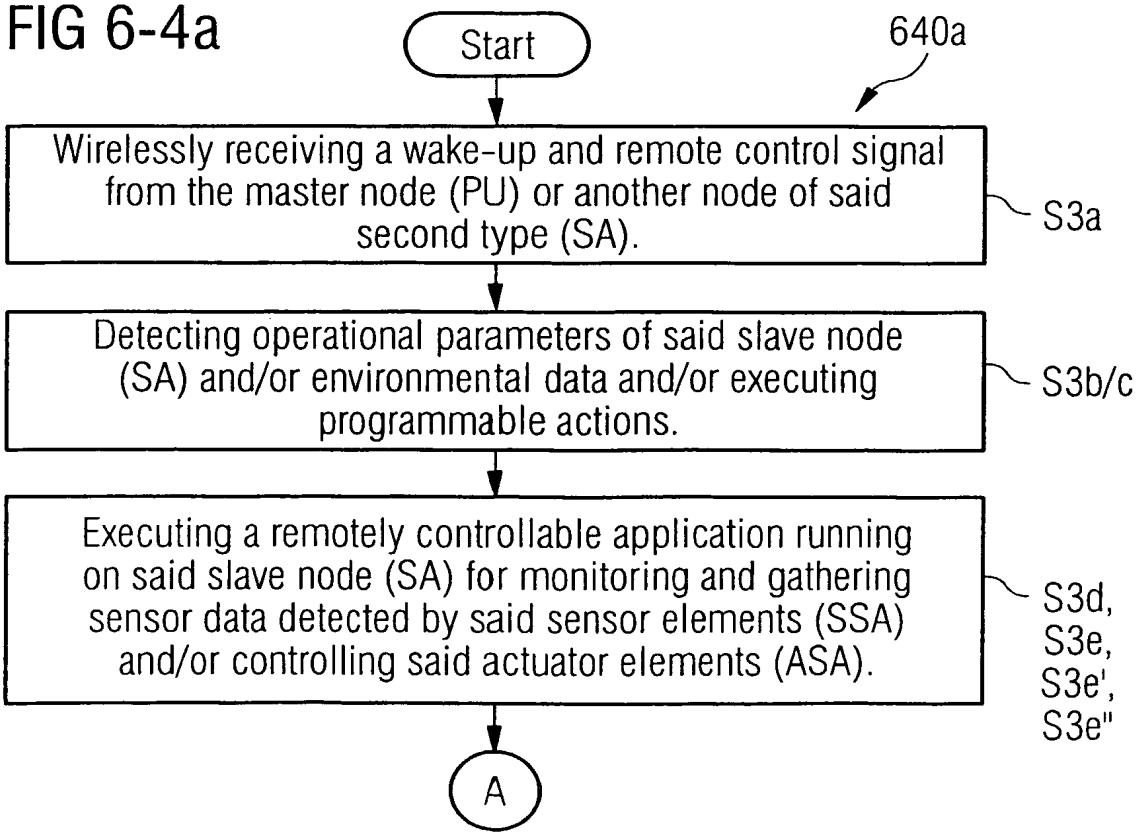
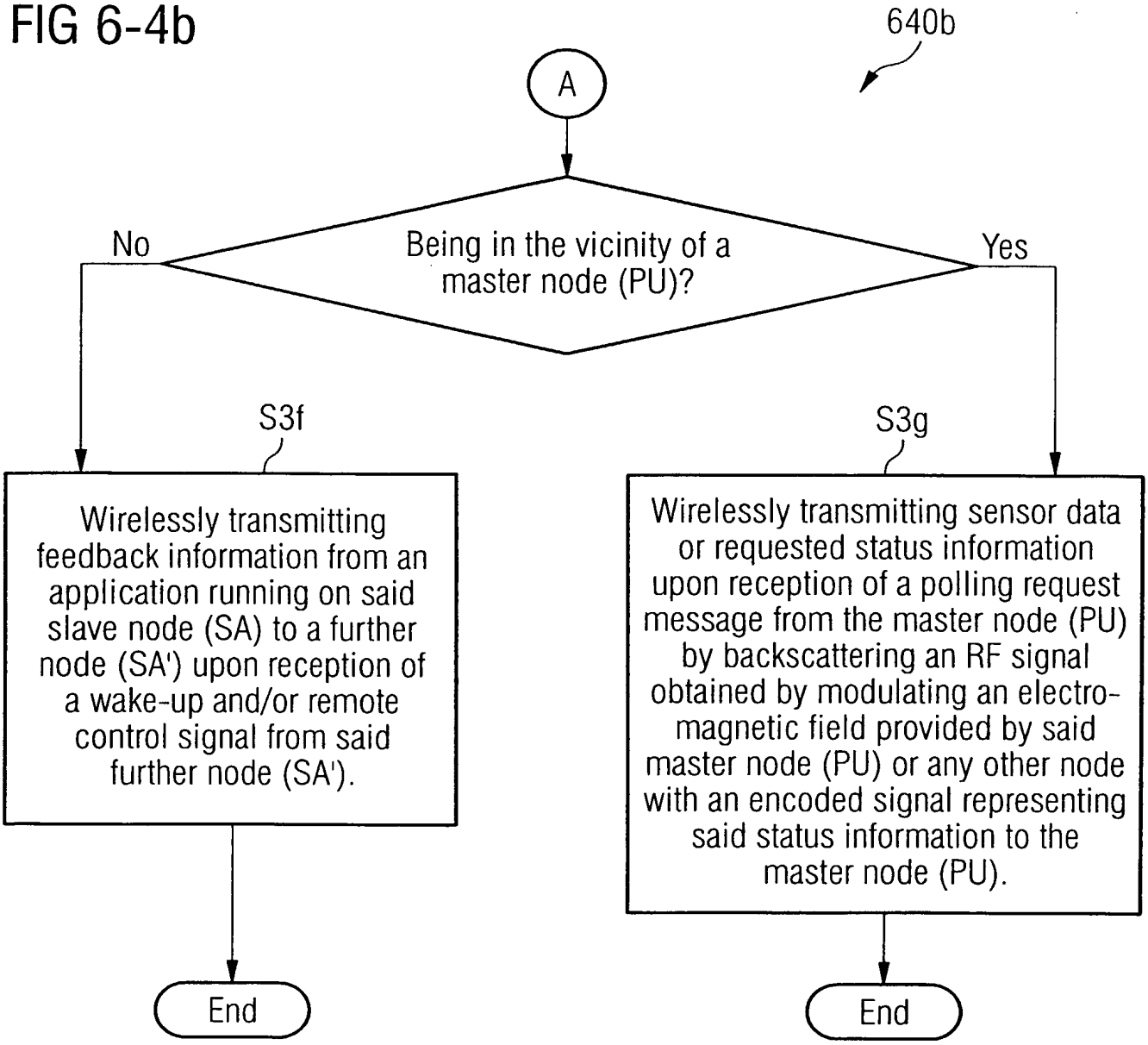


FIG 6-4b


640b
A
Being in the vicinity of a master node (PU)?
No
Yes
S3f
S3g
Wirelessly transmitting feedback information from an application running on said slave node (SA) to a further node (SA') upon reception of a wake-up and/or remote control signal from said further node (SA').
Wirelessly transmitting sensor data or requested status information upon reception of a polling request message from the master node (PU) by backscattering an RF signal obtained by modulating an electro-magnetic field provided by said master node (PU) or any other node with an encoded signal representing said status information to the master node (PU).
End
End